5.2 The Electric Force

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- In the mid/late 1700s, Coulomb measured the force exerted by one charged object on another as related to the distance between charges.

$$F_e = \frac{kQ_1Q_2}{R^2}$$ Coulomb's Law

later $k = 9 \times 10^9 \frac{N \cdot m^2}{C^2}$

similar to $F_g = \frac{GMm}{R^2}$

(if charge in $\mu C = \times 10^{-6} C$)

F_e is used for small charged bodies or for between the centres of uniformly charged larger bodies.

1 C of charge = charge on 6.2422×10^{18} electrons

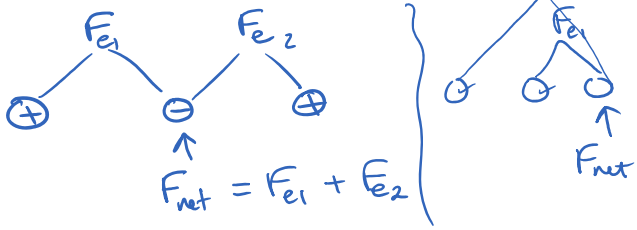
$$\rightarrow \text{charge on one } e^- = \frac{1\ C}{6.2422 \times 10^{18}\ e^-} = 1.602 \times 10^{-19} C \text{ per } e^-$$

negative for electrons
positive for protons

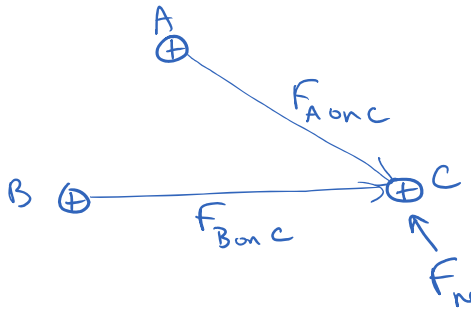
✡ Practice pg 169 #1-3
- watch units

Easy formula for 2 charges, but when we have 3 charges, we must use vector addition.

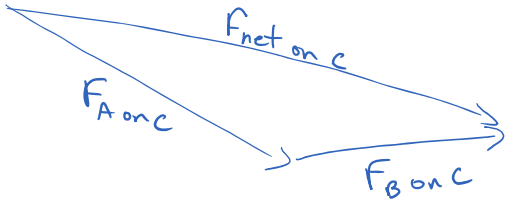
- 3 charges in a line (ex pg 170)



- 3 charges in a triangle (ex pg 171)



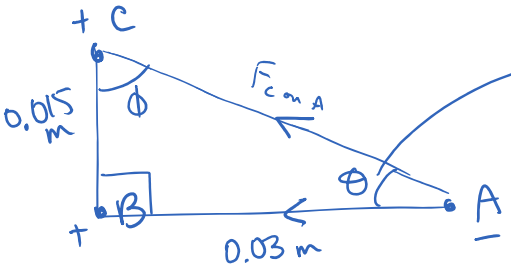
Sine Law
Cosine Law



Practice pg 172 #1
pg 175 #1-10

Pg 172 Hint

use lengths to get an angle



$\tan\theta = \frac{0.015}{0.03}$

$\theta =$

a)